

KENNEY FORT BOULEVARD

< ROADWAY IMPACT FEE STUDY >

March 23, 2011

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Prepared for

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March 23, 2011



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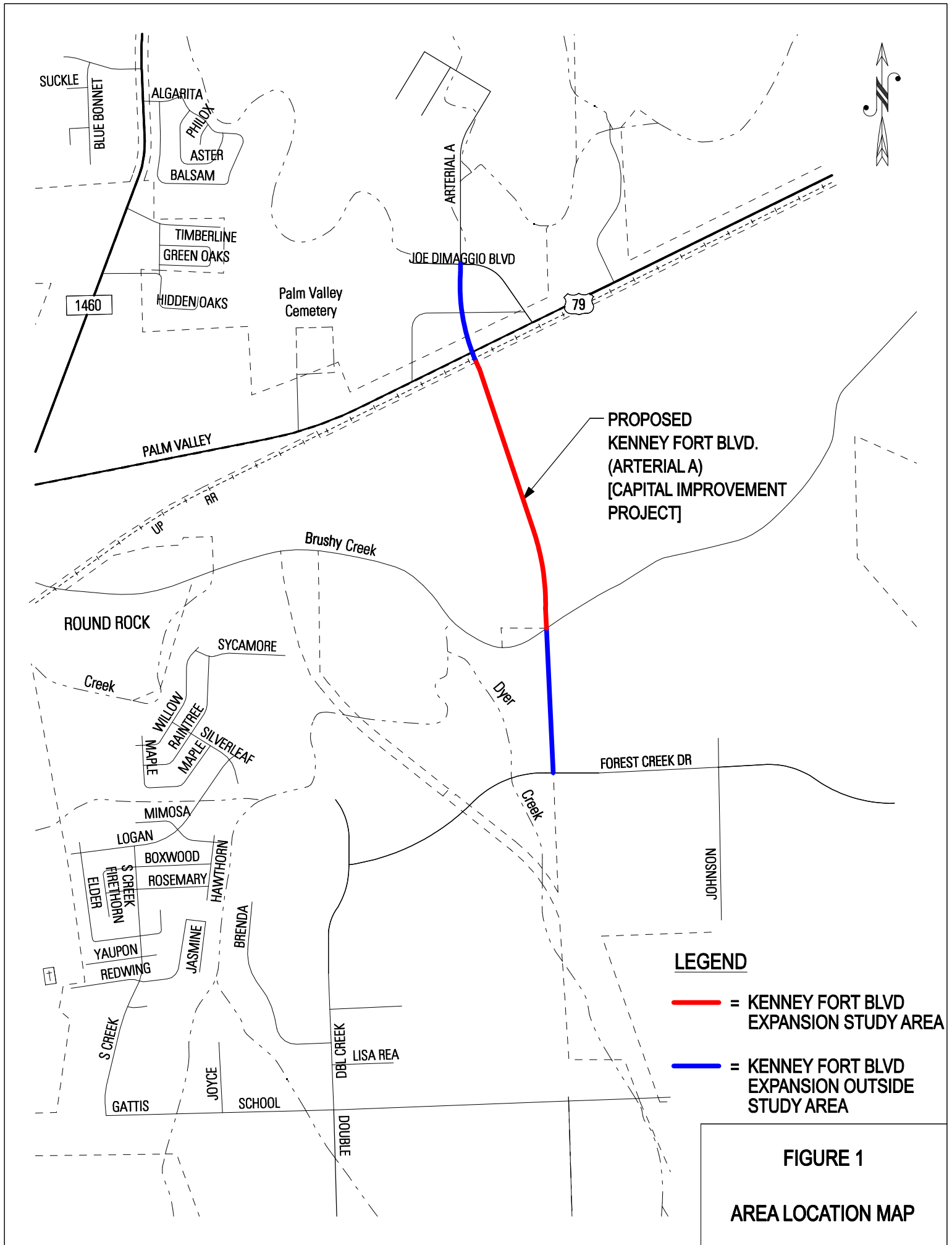
INTRODUCTION

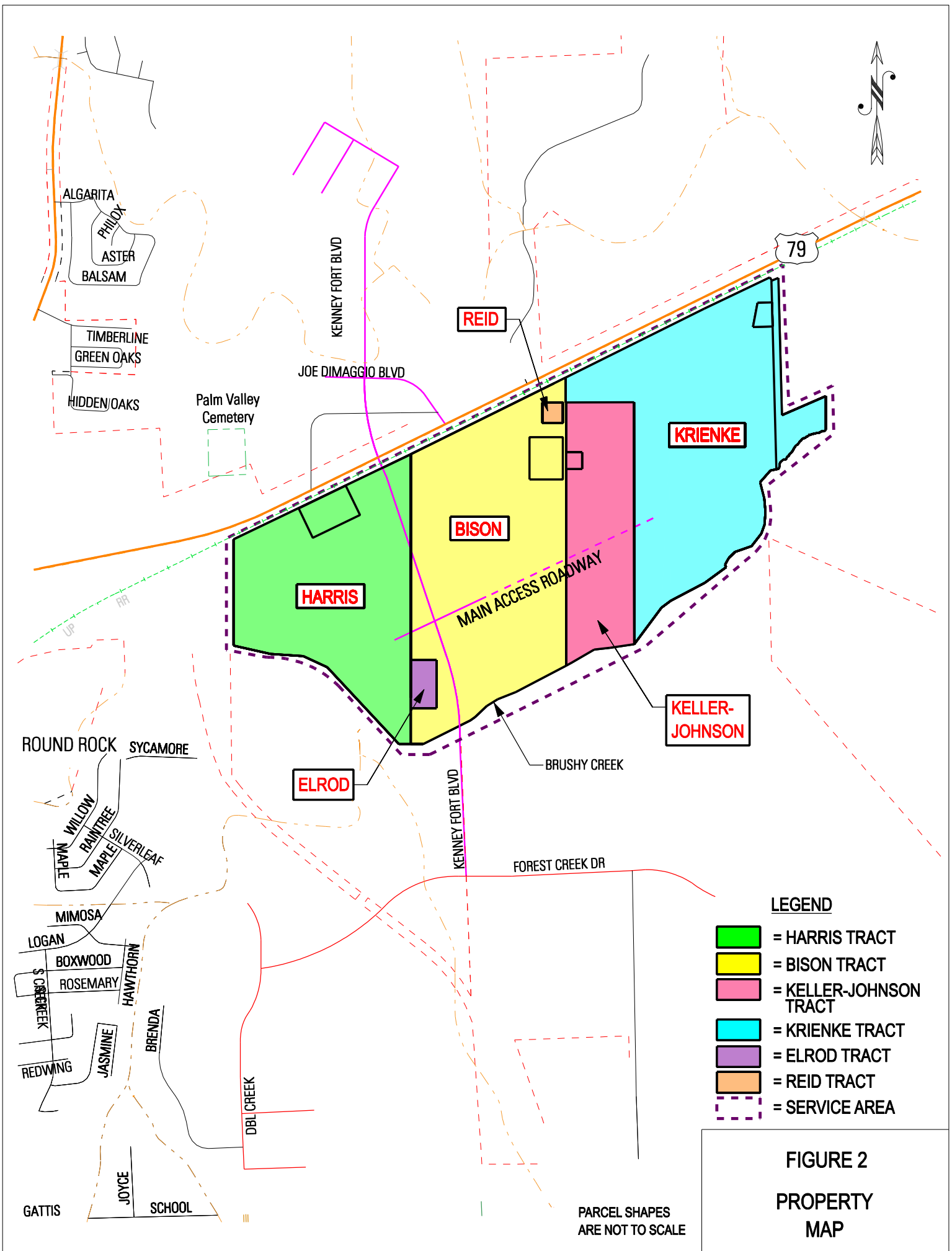
The City of Round Rock is engaged in development of proposed Kenney Fort Boulevard (Arterial A) to link Joe DiMaggio Boulevard at its current southern terminus with Forest Creek Drive, as shown in Figure 1. The facility would provide a grade-separated crossing at US 79 and the Union Pacific Railroad (UPRR), and would also provide bridge access across Brushy Creek. Kenney Fort Boulevard is being developed to provide improved access and mobility for residents of and visitors to the City, and will provide economic opportunities for land parcels located along its frontage which would directly benefit from access provided by the facility. With a goal of helping to make growth pay for more of its own infrastructure needs, a roadway impact fee study was performed for properties along the proposed alignment, to assess fees proportional to their projected land use development. The roadway impact fees were developed in accordance with Chapter 395 of the Texas Local Government Code (Ref. 1).

PROPOSED SITE AND ACCESS CHARACTERISTICS

Although several parcels are located along the proposed facility, six parcels will benefit in particular from its construction. These parcels are the Harris Tract, the Bison Tract, the Elrod Tract, the Reid Tract, the Keller-Johnson Tract, and the Krienke Tract, which are described in more detail within this report, and are illustrated in Figure 2. These tracts would benefit from construction of Kenney Fort Boulevard because they are bounded on the south by Brushy Creek and on the north by the UPRR. Improvement of these tracts from their current uses is dependent on having safe and efficient access to the roadway network, which would be provided only through the construction of Kenney Fort Boulevard. Future crossing of the railroad will not be allowed by UPRR upon redevelopment, so these land uses would be landlocked if access is not provided by construction of proposed Kenney Fort Boulevard. Access to Kenney Fort Boulevard for those properties without frontage or direct access to this proposed arterial will be provided by the main access roadway

shown in Figure 2, which is a conceptual rendition of the internal public collector street(s) which will be required under City subdivision and development regulations.





ROADWAY IMPACT FEE ASSESSMENT

The State of Texas Local Government Code, Chapter 395 (Ref. 1) sets forth legal guidelines and requirements for the assessment and collection of impact fees for public improvements required by new development in municipalities, counties, and certain other local governments. According to the Code, a political subdivision may impose an impact fee against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development provided that:

- The improvements or expansions are identified in a capital improvements plan (CIP) and Roadway Plan adopted by the political subdivision [Sec. 395.001(2)].
- The improvements or expansions are deemed necessary and attributable to new development in the service area [Sec. 395.001(2), (3) and (9)] based on the approved land use assumptions over at least a 10-year period [Sec. 395.001(5)], which shall be prepared by a qualified professional engineer licensed to perform professional engineering services in the State of Texas [Sec. 395.014(a)(1)].
- Fees assessed to new development do not exceed the costs associated with construction of the capital improvements or facility expansions [Sec. 395.012(a)].

In general the following steps were followed in development of the roadway impact fee study:

1. Description of proposed **Land Use Assumptions**
2. Description of the **Capital Improvement Plan (CIP)**
3. Estimation of projected service units by new development (**Trip Generation**)
4. Estimation of total **Roadway Capacity**
5. Evaluation of **Roadway Level of Service**
6. Estimation of **Roadway Impact Fee** per service unit

The above steps are discussed in detail in the subsequent sections of this report; however, before moving to that section of the report, a few basic definitions from Chapter 395 need to be understood and are described below:

Political Subdivision – means a municipality, a district, or authority created by the Texas Constitution. In this case the political subdivision is the City of Round Rock.

Service Area – For roadway facilities, the service area is limited to an area within the corporate boundaries of the political subdivision and shall not exceed six miles. In this case, the Service Area is the specific area of land identified in Figure 2.

Service Unit – means a standardized measure of consumption, use, generation, or discharge attributable to an individual unit of development calculated in accordance with generally accepted engineering or planning standards and based on historical data and trends applicable to the political subdivision in which the individual unit of development is located during the previous 10 years. In this case, the service unit is vehicles per hour (vph) during the peak hour.

Capital Improvement Plan (CIP) – means a plan that identifies eligible capital improvements or facility expansions to be funded in the next ten years for which impact fees may be assessed. In this case, the CIP is the construction of proposed Kenney Fort Boulevard, from south of UPRR to Brushy Creek as identified in Figure 1.

Land Use Assumptions – includes a description of the service area and projections of changes in land uses, densities, intensities, and population in the service area over at least a 10-year period.

New Development – means the subdivision of land; the construction, reconstruction, redevelopment, conversion, structural alteration, relocation, or enlargement of any structure; or any use or extension of the use of land; any of which increases the number of service units. In this case, the New Development is the development of land identified in Figure 2.

Impact Fees – means a charge or assessment imposed by a political subdivision against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development.

LAND USE ASSUMPTIONS

Of particular interest in this study are the land uses adjacent to the proposed alignment of Kenney Fort Boulevard between the UPRR and Brushy Creek. Because of their geographic locations and configurations [which were obtained from the Williamson Central Appraisal District (Ref. 2) and shown in Figure 2], these tracts would be required to provide access to the City's roadway network exclusively via Kenney Fort Boulevard upon improvement of their current land uses. These access restrictions define an appropriate Service Area in accordance with Sec. 395.001(9) and are shown in Figure 2. Currently (Year 2011), these tracts serve agricultural uses, with rural single family homes located on six sub-parcels within the study area as shown in Table 1. The single family homes currently have access across the UPRR to US 79, but these access points are not adequate to serve the needs of the proposed land uses. Furthermore, the increased number of vehicle trips crossing the railroad would pose a significant safety liability to the UPRR and the developments that would likely warrant closure or restriction of these access points prior to or upon buildout. Parcel sizes on each tract (obtained from the Williamson Central Appraisal District) and existing and future land use projections on each tract [obtained from the City of Round Rock (Ref. 3)] are listed in Tables 1 and 2, respectively. The proposed land use assumptions provided by the City include projections over a 10-year period in accordance with Sec. 395.001(5) and are compliant with the City of Round Rock's "General Plan 2020".

Table 1.
Summary of Existing Land Uses and Population (Year 2011) within Service Area

Tract Name/Description	Total Acreage	Existing Land Use	Population (persons)¹
Harris Tract	113.17 Ac	Agricultural	0
Bison Tract	157.39 Ac	Agricultural	0
		Single Family Residential (1 unit)	2.68
Elrod Tract	4.41 Ac	Agricultural	0
		Single Family Residential (1 unit)	2.68
Reid Tract	1.50 Ac	Single Family Residential (1 unit)	2.68
Keller-Johnson Tract	60.58 Ac	Agricultural	0
		Single Family Residential (1 unit)	2.68
Krienke Tract	157.09 Ac	Agricultural	
		Single Family Residential (2 unit)	5.36
Total (All Tracts)	494.14 Ac		17

¹ Based on average household size of 2.68 persons per house (2010 Census, Source – City of Round Rock)

Table 2.
Summary of Projected Land Uses and Population (Year 2021) within Service Area

Tract Name/Description	Total Acreage	Projected Land Use	Size	Population (persons) ¹
Harris Tract	113.17 Ac			
		Business Park	542,583 SF	0
		Shopping Center	402,494 SF	0
		R&D Center	673,002 SF	0
Bison Tract	157.39 Ac	Shopping Center (mixed-use)	162,043 SF	0
		Office (mixed-use)	162,043 SF	0
		Business Park	565,714 SF	0
		Shopping Center (live-work)	210,068 SF	0
		Apartments (live-work)	241 DU	609
		Apartments	212 DU	536
		Plaza/Greenspace	5.32 Acres	0
Elrod Tract	4.41 Ac	Apartments	66 DU	167
Reid Tract	1.50 Ac	Business Park	19,602 SF	0
Keller-Johnson Tract	60.58 Ac	Business Park	649,480 SF	0
Krienke Tract	157.09 Ac	Business Park	1,604,228 SF	0
Total (All Tracts)	494.14 Ac			1,312

¹ Based on average household size of 2.68 persons per house and occupancy of 94.2% for Apartments (2010 Census, Source – City of Round Rock)

CAPITAL IMPROVEMENT PLAN

Kenney Fort Boulevard is a proposed roadway facility which will connect Joe DiMaggio Boulevard at its current southern terminus and Forest Creek Drive, as shown in Figure 1. The capital improvement plan includes only the section between the UPRR right-of-way and Brushy Creek as shown in Figure 1. The City of Round Rock Transportation Master Plan (Ref. 4) identifies Kenney Fort Boulevard as a proposed ultimate six-lane major divided arterial with 130' of right-of-way between US 79 and Forest Creek Drive to be constructed as a half section by 2010. Kenney Fort Boulevard has been identified as a priority transportation project in the City of Round Rock's Capital Improvement Program (Ref. 5) for fiscal year 2009-2010. As part of this project, a grade separation will be provided at the crossings of US 79 and the UPRR, and a bridge will be

constructed across Brushy Creek. Section 395.014(a)(1) of the Local Government Code requires a description of the existing capital improvements within the service area. There are none. The only capital improvement to be constructed is Kenney Fort Boulevard as described above.

Although Kenney Fort Boulevard is being constructed from Joe DiMaggio Boulevard to Forest Creek Drive as a six-lane divided section, only the portion of the roadway between Brushy Creek and the UPRR right-of-way is being considered for roadway impact fee assessment. The study area is detailed in Figure 1 [Sec. 395.001(8) and (9)]. Sec. 395.012 of the Local Government Code allows the following items to be included in the impact fee assessment: the costs of constructing capital improvements, including and limited to the construction contract price; surveying and engineering fees; land acquisition costs, including land purchases, court awards and costs, attorney's fees, and expert witness fees; and fees actually paid or contracted to be paid to an independent qualified engineer or financial consultant preparing or updating the capital improvements plan who is not an employee of the political subdivision. The eligible capital improvement costs for the portion of the roadway between Brushy Creek and the UPRR right-of-way are **\$8,165,835** and are summarized in the Appendix.

TRIP GENERATION (PROPOSED SERVICE UNITS - DEMAND)

As per the Local Government Code, the projected demand for capital improvements required by new service units should be projected over a reasonable period of time, not to exceed 10 years. The proposed land uses are assumed to be developed within the 10-year period. The total trips generated by the new land uses is a portion of the total demand placed on the roadway system. The service unit for the number of trips generated by the new development is expressed in vehicles per hour (vph). Determining the traffic that will be generated due to the development of the proposed land uses is a key factor in the analysis. Unadjusted total trips per day, as well as the peak hour traffic associated with the project, were estimated using the microcomputer program "Trip Generation" by Microtrans Corporation (Ref. 6), which is based on recommendations and data contained in the Institute of Transportation Engineers' report Trip Generation (Ref. 7). Table 3 provides a detailed summary of traffic production, which is directly related to the land uses within the Service Area shown in Figure 2. As a point of reference, the total unadjusted AM and PM peak hour trips for these land uses were estimated at 6,853 vph and 9,010 vph, respectively.

Table 3.
Summary of Unadjusted Daily and Peak Hour Trip Generation

Land Use/Tract	ITE Land Use Code	Size	24-Hour Two Way Volume (vpd)	AM Peak Hour (vph)		PM Peak Hour (vph)	
				Enter	Exit	Enter	Exit
Harris Tract							
Business Park	770	542,583 SF	6,923	651	125	165	551
Shopping Center	820	402,494 SF	16,789	214	137	792	825
R&D Center	760	673,002 SF	4,816	569	117	93	527
Subtotal (Harris Tract)			28,528	1,434	379	1,050	1,903
Bison Tract							
Shopping Center (mixed use)	820	162,043 SF	9,294	125	80	431	448
General Office (mixed use)	710	162,043 SF	1,935	243	33	44	216
Business Park	770	565,714 SF	7,219	678	130	170	571
Shopping Center (live-work)	820	210,068 SF	11,002	146	93	513	533
Apartments (live-work)	220	241 DU	1,584	24	97	98	53
Apartments	220	212 DU	1,379	21	85	85	46
Plaza/Greenspace	-	5.32 Acres	-	-	-	-	-
Subtotal (Bison Tract)			32,413	1,237	518	1,341	1,867
Elrod Tract ¹							
Apartments	220	66 DU	429	7	27	26	14
Reid Tract ¹							
Business Park	770	19,602 SF	250	24	5	6	20
Keller-Johnson Tract							
Business Park	770	649,480 SF	8,287	779	149	194	650
Krienke Tract							
Business Park	770	1,604,228 SF	20,470	1,925	369	446	1,493
Total (All Tracts)			90,377	5,406	1,447	3,063	5,947

¹Due to the size and location of Elrod and Reid tracts, and their compatible land uses with those reported in Bison Tract, these two tracts were combined with Bison Tract for trip generation purposes only.

Analysis Assumptions for Trip Generation

Unadjusted trip generation data described above assumes stand-alone uses in isolated conditions. Real world trip generation is dependent on many factors, including but not limited to the size of various uses, the interaction of those uses with one another, and the accessibility of those uses to alternative modes such as transit and pedestrian traffic. The analysis process thus involves both the use of primary data and engineering judgment on transferable parameters. Specifically, engineering judgment is required for estimation of pass-by capture, internal capture, and transit trip reductions, all of which are further described in the following paragraphs. These adjustments to estimated trip generation are required to determine the vehicular trips on Kenney Fort Boulevard which occur on the roadway as a result of the land uses within the Service Area.

Pass-By Capture – PM peak hour pass-by reductions are based on information contained in the ITE Trip Generation Handbook (Ref. 8) and were calculated automatically by the microcomputer program “Trip Generation” by Microtrans (Ref. 6). For this study, pass-by reductions were taken only for shopping center land uses, as residential and office uses do not generally experience pass-by traffic and are not documented by ITE. Direct pass-by reductions are detailed in Table 4 below:

Table 4.
Summary of Direct Pass-by Trip Reductions for Shopping Center Land Uses

Tract	Land Use	Size	PM Peak Trip Reductions ¹	
			Enter	Exit
Harris	Shopping Center	402,494 SF	206	215
Bison	Shopping Center	162,043 SF	146	152
	Shopping Center	210,068 SF	161	168
Total Pass-by Trip Reductions			513	535

Internal Capture – Once the total build-out of proposed land uses occurs, there will be interaction among the uses within the development. Internal capture accounts for trip reduction due to lower retail trip generation rates for adjacent retail land uses as well as multipurpose trip-making among different types of land uses which are in close proximity. As part of this study, procedures defined in the ITE Trip Generation Handbook (Ref. 8) were used for all six tracts, with Harris Tract land

uses analyzed separately and Bison, Reid, Elrod, Keller-Johnson, and Krienke Tracts analyzed together to reflect their geographic and access characteristics. It should be noted that the internal capture reductions herein are unique to this combination of land use types and locations within the Service Area. The results of this analysis and associated direct trip reductions are detailed in Table 5.

Table 5.
Summary of Direct Internal Capture Reductions by Tract

Tract	Land Use	Size	PM Peak Trip Reductions ¹	
			Enter	Exit
Harris	Business Park	542,583 SF	17	12
	Shopping Center	402,494 SF	12	18
	R&D Center	673,002 SF	12	11
	Combined Uses		41	41
Bison	Shopping Center	162,043 SF	89	97
	General Office	162,043 SF	3	3
	Business Park	565,714 SF	10	9
	Shopping Center	210,068 SF	98	103
	Apartments	241 DU	32	27
	Apartments	212 DU	27	24
	Plaza/Greenspace	5.32 Acres	-	-
	Combined Uses		259	263
Elrod	Apartments	66 DU	9	7
Reid	Business Park	19,602 SF	0	0
Keller-Johnson	Business Park	649,480 SF	12	11
Krienke	Business Park	1,604,228 SF	25	24
Total Internal Capture Reductions			346	346

Transit Trips – Transit service is not available and therefore, no transit reduction was assumed for land uses included in this study.

Table 6 provides a detailed summary of adjusted traffic production during the peak hours, which is directly related to the assumed land use plan. All reductions mentioned previously have been included.

Table 6.
Summary of Adjusted Peak Hour Trip Generation

Land Use/Tract	ITE Land Use Code	Size	AM Peak Hour (vph)		PM Peak Hour (vph)	
			Enter	Exit	Enter	Exit
Harris Tract						
Business Park	770	542,583 SF	651	125	148	539
Shopping Center	820	402,494 SF	214	137	574	592
R&D Center	760	673,002 SF	569	117	81	516
Subtotal (Harris Tract)			1,434	379	803	1,647
Bison Tract						
Shopping Center (mixed use)	820	162,043 SF	125	80	196	199
General Office (mixed use)	710	162,043 SF	243	33	41	213
Business Park	770	565,714 SF	678	130	160	562
Shopping Center (live-work)	820	210,068 SF	146	93	254	262
Apartments (live-work)	220	241 DU	24	97	66	26
Apartments	220	212 DU	21	85	58	22
Plaza/Greenspace	-	5.32 Acres	-	-	-	-
Subtotal (Bison Tract)			1,237	518	775	1,284
Elrod Tract						
Apartments	220	66 DU	7	27	17	7
Reid Tract						
Business Park	770	19,602 SF	24	5	6	20
Keller-Johnson Tract						
Business Park	770	649,480 SF	779	149	182	639
Krienke Tract						
Business Park	770	1,604,228 SF	1,925	369	421	1,469
Total (All Tracts)			5,406	1,447	2,204	5,066

As noted at the bottom of Table 6, after reductions, the total PM peak hour trips for all tracts are 7,270. This is greater than the 6,853 adjusted AM peak hour trips for the same land uses. For this reason, the PM peak hour was selected as the controlling time period for traffic analysis purposes on the subject tracts.

Trip Generation Conversion Table – Sec. 395.014(a)(4) requires the provision of a table to quantify the PM peak hour trip generation rate for the following land use categories: residential, commercial, and industrial. Due to the variability of potential specific land uses within these three

land use types, Table 7 summarizes the PM peak hour trip generation rates for several common land uses. For land uses not listed in Table 7, the latest edition of Trip Generation (Ref. 6, 7) will be used to determine trip generation characteristics.

Table 7.
Conversion Table for Estimating Trips

Land Use Category ¹	ITE Land Use Code	Development Unit ²	Unadjusted Trip Gen Rate/Equation (PM) ^{1,2,3}	Pass-by Rate ⁴ (%)	Internal Capture ⁵ (%)	Adjusted Trip Gen Rate/Equation (PM) ⁶
RESIDENTIAL						
Single-Family Detached Housing	210	DU	$\text{Ln}(T) = 0.90 \text{ Ln}(X) + 0.51$		7.7	$0.923 \times T$
Apartments	220	DU	$T = 0.55X + 17.65$		7.7	$0.923 \times T$
Residential Condominium/Townhouse	230	DU	$\text{Ln}(T) = 0.82 \text{ Ln}(X) + 0.32$		7.7	$0.923 \times T$
COMMERCIAL						
General Office Building	710	1,000 SF (GFA)	$T = 1.12X + 78.81$		7.7	$0.923 \times T$
Medical/Dental Office Building	720	1,000 SF (GFA)	$\text{Ln}(T) = 0.88 \text{ Ln}(X) + 1.59$		7.7	$0.923 \times T$
Research and Development Center	760	1,000 SF (GFA)	$\text{Ln}(T) = 0.82 \text{ Ln}(X) + 1.09$		7.7	$0.923 \times T$
Business Park	770	1,000 SF (GFA)	$\text{Ln}(T) = 0.92 \text{ Ln}(X) + 0.78$		7.7	$0.923 \times T$
Free-Standing Discount Store	815	1,000 SF (GFA)	5.00	17	7.7	3.83
Shopping Center	820	1,000 SF (GFA)	$\text{Ln}(T) = 0.67 \text{ Ln}(X) + 3.37$	34	7.7	$0.609 \times T$
Supermarket	850	1,000 SF (GFA)	$\text{Ln}(T) = 0.61 \text{ Ln}(X) + 3.95$	36	7.7	$0.591 \times T$
Convenience Market with Gasoline Pumps	853	VFP	19.07	56	7.7	7.74
Home Improvement Superstore	862	1,000 SF (GFA)	2.37	48	7.7	1.14
Pharmacy/Drugstore with Drive-Thru	881	1,000 SF (GFA)	10.35	49	7.7	4.87
Walk-in Bank	911	1,000 SF (GFA)	12.13		7.7	11.20
Drive-in Bank	912	1,000 SF (GFA)	25.82	47	7.7	12.63
High Turnover (Sit-Down) Restaurant	932	1,000 SF (GFA)	11.15	43	7.7	5.87
Fast Food Restaurant with Drive-Thru	934	1,000 SF (GFA)	33.84	50	7.7	15.62
Fast Food Restaurant without Drive-Thru ⁸	936	1,000 SF (GFA)	26.15	50	7.7	12.07
INDUSTRIAL						
General Light Industrial	110	1,000 SF (GFA)	$T = 1.43X - 157.36$		7.7	$0.923 \times T$
General Heavy Industrial	120	1,000 SF (GFA)	0.68		7.7	0.63
Industrial Park	130	1,000 SF (GFA)	$T = 0.77X - 42.11$		7.7	$0.923 \times T$
Manufacturing	140	1,000 SF (GFA)	$T = 0.78X - 15.97$		7.7	$0.923 \times T$
Warehousing	150	1,000 SF (GFA)	$\text{Ln}(T) = 0.64 \text{ Ln}(X) + 1.14$		7.7	$0.923 \times T$
Mini-Warehouse	151	1,000 SF (GFA)	$\text{Ln}(T) = 1.02 \text{ Ln}(X) - 1.49$		7.7	$0.923 \times T$

Notes:

1. Trip generation rates and equations for various land uses are obtained from "Trip Generation, An ITE Informational Report, 8th Edition"
2. DU = Dwelling Units; SF (GFA) = Gross Floor Area expressed as "Square Feet"; VFP = Vehicle Fueling Positions; Ln = Natural Log; T = PM Peak Hour Trips; X = Size of the Land Use
3. In accordance with recommendations provided in Trip Generation Handbook, a trip generation rate cannot be used for all land uses since the relationship between the size of development and trip generation rate can be non-linear. In such cases, equations provide a more reliable estimate of trips and should be used.
4. Pass-by percentages are obtained from "Trip Generation Handbook, An ITE Proposed Recommended Practice, March 2001"
5. An internal capture reduction of 7.7% for all land uses is assumed based on the proposed Service Area land uses.
6. The adjusted rate should be used for developing the PM peak hour trips. See below for example calculations:
Example 1: 100,000 SF of Home Improvement Superstore
Example 2: 100,000 SF of General Office
Example 3: 100,000 SF of Warehouse
 $\text{Adjusted Trips}(T) = 1.14 \times 100 = 114 \text{ PM Peak Hour Trips (PHT)}$
 $\text{Adjusted Trips}(T) = 1.12 \times (100) + 78.81 = 191 \text{ PHT}$
 $\text{Adjusted Trips}(T) = 0.923 \times 191 = 176 \text{ PHT}$
 $\text{Adjusted Trips}(T) = 0.64 \text{ Ln}(100) + 1.14 = 4.09$
 $\text{Adjusted Trips}(T) = 0.923 \times \text{Exponential}(4.09) = 55 \text{ PHT}$
7. For land uses not shown in this table, the latest edition of "Trip Generation" report should be used.
8. Pass-by rate for Fast Food Restaurant without Drive-Thru is not provided in the ITE Trip Generation Handbook. A 50% pass-by rate is recommended for Fast Food with Drive-Thru. Due to similarity in land uses, a 50% pass-by rate is assumed for Fast Food Restaurant without Drive-Thru also.

ROADWAY CAPACITY (AVAILABLE SERVICE UNITS - SUPPLY)

As per the Local Government Code, an analysis of the total capacity, the level of current usage, and commitments for usage of capacity of the existing capital improvements, shall be prepared by a qualified professional engineer. The total roadway capacity of Kenney Fort Boulevard is the supply that is available to meet the needs of the demand. The service unit for roadway capacity is expressed in vehicles per hour (vph) during the PM peak.

In the hierarchy of street transportation facilities, urban streets (including arterials) are ranked between local streets and multilane suburban and rural highways. The difference is determined principally by street function, control conditions, and the character and intensity of roadside development. Kenney Fort Boulevard most closely fits in the category of Arterial Urban Street; however, analysis of Kenney Fort Boulevard as an urban street would require many factors that either cannot be easily quantified during the design stage or are subject to change over time. These factors include signal density, signal cycle length, effective green ratios, lane utilization factors, and turning movements. As these factors change, the effective capacity of the roadway would also change. Urban street level of service is defined in terms of average travel speed rather than peak hour flow rate. Given the dynamic and uncertain nature of the methodology, separation of developer shares of the capacity of the roadway would be unreliable. In order to provide an equitable calculation of roadway capacity and developer shares, Kenney Fort Boulevard was analyzed as a multilane highway. The Highway Capacity Manual (HCM) (Ref. 9) is a standard document for capacity evaluation of roadway facilities and is an industry standard. Since the available data included trips generated by proposed land uses, comparing site traffic volume to roadway capacity was deemed the appropriate methodology for this study. Furthermore, a multilane highway analysis results in calculation of a greater capacity than a similar analysis on an urban street. Therefore, the volume to capacity (v/c) ratio will be lower for a multilane highway, resulting in a lower fiscal contribution for property owners in this study area. Further discussion of multilane highway analysis is presented below.

Multilane highways are suburban or rural facilities with four, six, or more lanes that may be separated by a median or two-way left turn lane, or may be undivided. Multilane highways differ from freeway facilities in that they provide direct access from the surrounding roadway network.

Capacity on multilane highways is defined as maximum service flow rate, which is the maximum number of passenger car equivalents that can occupy a single lane in one hour, and is measured in passenger cars per hour per lane (pcphpl). The capacity of multilane highways is based on free-flow speed, and ranges between 1,900 pcphpl at 45 mph to 2,200 pcphpl at 60 mph. The LOS for multilane highways is defined by four inter-related factors: maximum density (pc/mi/ln), average speed (mph), maximum volume to capacity ratio (v/c), and maximum service flow rate (pcphpl), all of which are dependent on free flow speed. As a point of reference, the calculated free-flow speed on Kenney Fort Boulevard for the six-lane arterial is 46.6 mph, per HCM methodology based on design speed, resulting in a capacity of 1,932 vph (per lane), or 5,796 vph for each direction of travel (3 lanes). Accounting for both directions of travel (6 lanes), the total roadway capacity for the six-lane Kenney Fort Boulevard section is 11,592 vph. [Sec. 395.014(a)(2)]

ROADWAY LEVEL OF SERVICE

To determine the impact of projected site traffic on the proposed Kenney Fort Boulevard, a roadway analysis was performed based on the requirements set forth in the Highway Capacity Manual. The arterial six-lane section on Kenney Fort Boulevard, north and south of the proposed land uses was analyzed to determine roadway levels of service.

Once site generated trips were known (as described in previous sections), the next step involved distribution of those trips to appropriate geographic directions and logical connecting roadways. The major thoroughfares that have a direct bearing on the accessibility of the project have been previously identified. Since Kenney Fort Boulevard is not an existing roadway, existing traffic volume information was not available within the study area network. The Capital Area Metropolitan Planning Organization (CAMPO) Mobility 2030 Plan (Ref. 10) and associated travel demand model (Ref. 11) provided the basis for distribution assumptions. All site traffic ingress/egress was assumed to occur on Kenney Fort Boulevard and originate to the north or south of the project sites. Based on the sources mentioned above, a distribution of 60 percent to/from the north and 40 percent to/from the south on Kenney Fort Boulevard was assumed for site generated traffic.

Applying site generated traffic to the proposed roadway segment as described above, Kenney Fort Boulevard would operate at Level of Service C under buildout as a six-lane divided arterial. The

roadway capacity analysis did not consider the effect of background or pass-through traffic on the proposed facility, as these factors do not contribute to the developer shares of the roadway capacity. Inclusion of background and pass-through trips, which would be diverted to the facility upon completion, will impact the LOS on the facility. Site traffic accessing proposed Kenney Fort Boulevard is illustrated in Figure 3.

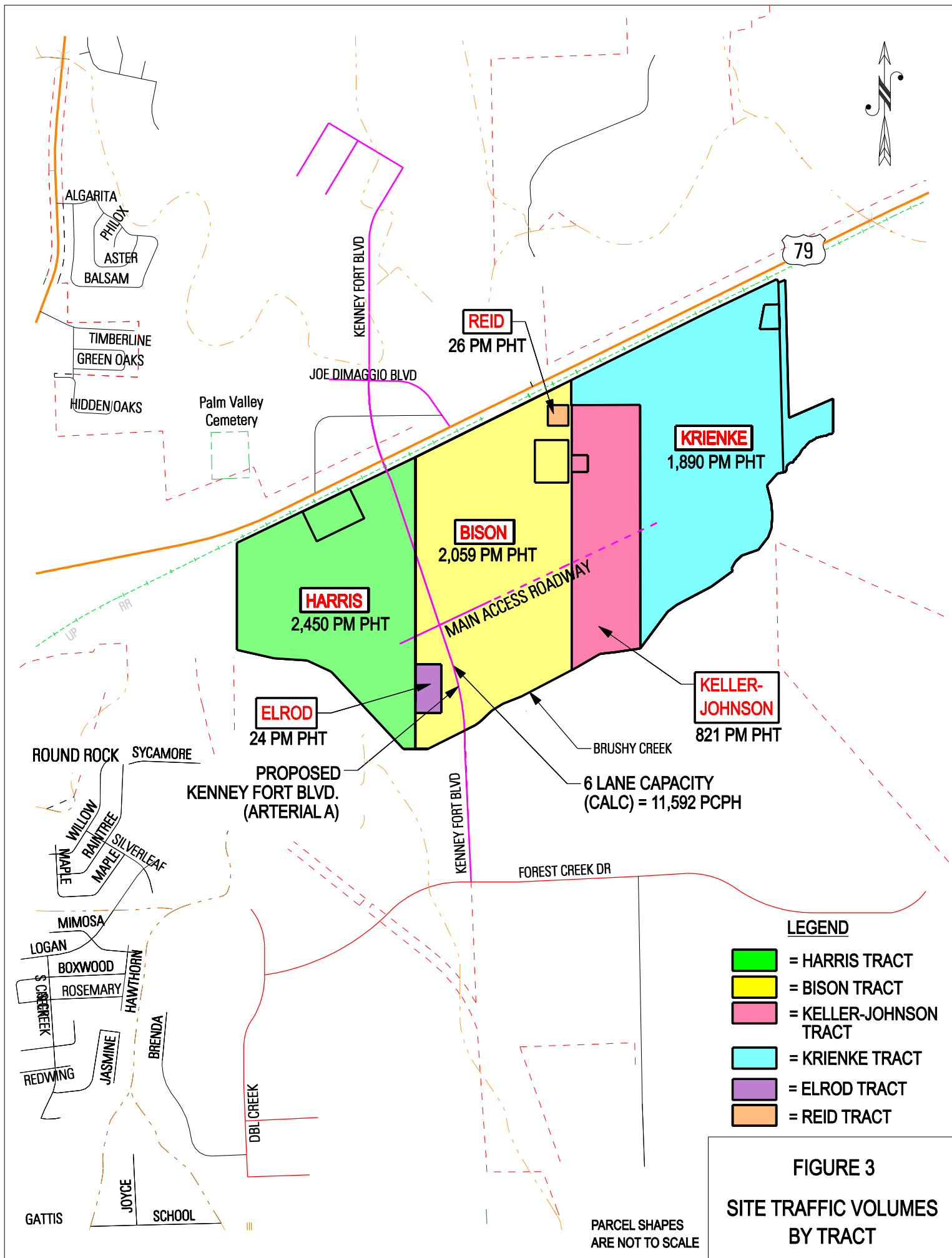


FIGURE 3
SITE TRAFFIC VOLUMES
BY TRACT

ROADWAY IMPACT FEE

The final analysis step in the development of roadway impact fees is evaluation of the maximum fee per service unit. In the preceding sections, the total capacity (supply) of the new roadway system was developed and the demand placed on that system by the new development was identified. As per the Local Government Code, the maximum fee per service unit may not exceed the cost of CIP attributable to the new development (adjusted for any tax credit) divided by the total number of projected service units attributable to the new development. These variables define the basis of the fee per service unit and are discussed below:

Cost of CIP Attributable to the New Development

As discussed in the previous sections, the eligible expenses to be included in the impact fee for the proposed Kenney Fort Boulevard, as a six-lane divided arterial within the defined study area, will total an estimated **\$8,165,835** as shown in the Appendix. The total available capacity of the roadway system is **11,592 vph**, and the demand placed on the roadway by the new development is **7,270 vph**. Therefore, the percent of roadway capacity used by the development is **62.7%** which translates to **\$5,121,258** that is attributable to the new development. Table 8 provides a summary of the cost per tract.

Table 8.
Pro-Rata Share Estimate of Site Traffic to Roadway Capacity on Kenney Fort Boulevard

Tract	Adjusted PM Peak Hour Trips (vph)			Percent of Multilane Roadway Capacity Used	Proposed Developer Share of Facility Cost
	Enter	Exit	Total		
Harris	803	1,647	2,450	21.1	\$1,725,871
Bison	775	1,284	2,059	17.8	1,450,436
Elrod	17	7	24	0.2	16,906
Reid	6	20	26	0.2	18,315
Keller-Johnson	182	639	821	7.1	578,343
Krienke	421	1,469	1,890	16.3	1,331,386
Total	2,204	5,066	7,270	62.7	\$5,121,258

Credit

As per the Local Government Code, as part of the Capital Improvements Plan, there must be a plan for awarding:

- (A) a credit for the portion of ad valorem tax and utility service revenues generated by new service units during the program period that is used for the payment of improvements, including the payment of debt, that are included in the capital improvements plan; or
- (B) a credit equal to 50 percent of the total projected cost of implementing the capital improvements plan.

Based on discussions with the City, ad valorem tax and utility service revenues will not be used for the construction of Kenny Fort Boulevard; therefore, no tax credit was applied to the cost of improvements attributable to the new development.

Total Number of Projected Service Units Attributable to the New Development

As discussed in the previous sections, the total number of service units attributable to the new development is **7,270 vph**.

Maximum Fee Per Service Unit

Given the cost of CIP attributable to the new development of **\$5,121,258** and the total number of projected service units of **7,270 vph**, the maximum fee per service unit is **\$704**. It should be noted that in the event of the increase in the number of service units, the additional impact fees to be imposed are limited to the amount attributable to the additional service units [Sec. 395.017].

The City should abide by the regulations set forth in the Texas Local Government Code regarding application and collection of roadway impact fees.

SUMMARY AND RECOMMENDATIONS

Based on the results of the analysis, it is recommended that the properties noted in this report be assessed a roadway impact fee proportional to the percentage of roadway capacity utilized at the time of development of their proposed land uses. The standard unit to be used in calculating the fees should be PM peak hour trips generated by proposed land uses, not to exceed **62.7** percent of the total eligible costs for the six-lane roadway section, or **\$5,121,258** as defined in Table 8 for each of the six tracts. The developer then would be assessed a roadway impact fee per service unit as adopted by the City of Round Rock. In this case the service unit is PM peak hour trips (PHT) generated by the land uses. In the event of the increase in the number of service units, the additional impact fees to be imposed are limited to the amount attributable to the additional service units.

The key points of the study are summarized in Table 9.

Table 9.
Summary of Key Findings

Description	Values	Source
Projected Service Units, vph (Demand) ¹	7,270 vph	Trips generated by new land uses estimated using ITE methodology
Available Total Roadway Capacity (Supply) for a Six Lane Section	11,592 vph	Calculated based on HCM methodology
Eligible Costs, Kenney Fort Boulevard [UPRR Right-of-Way to Brushy Creek] ²	\$8,165,835	Based on roadway design preliminary cost estimate
Percent of Capacity Attributable to the New Development	62.7%	=7,270 vph/11,592 vph
Cost of CIP Attributable to the New Development	\$5,121,258 (Not to Exceed)	= (62.7*\$8,165,835)/100
Credit for Tax	\$0	City will not use funds from either ad valorem tax or utility revenues for this project
Maximum Impact Fee Per PM Peak Hour Adjusted Trip (rounded to the lower dollar)	\$704	=\$5,121,258/7,270 vph

1. The six tracts are Harris, Bison, Elrod, Reid, Keller-Johnson, Krienke. Refer to Table 8 for breakdowns of Adjusted PM PHT and pro-rata shares by each tract.
2. Costs Exclude Utility Relocation and Construction Inspection fees

REFERENCES

1. Local Government Code, Chapter 395. Financing Capital Improvements Required by New Development in Municipalities, Counties, and Certain Other Local Governments, State of Texas, 71st Legislature, 1989, 75th Legislature, 1997, 77th Legislature, 2001, Amended 1989, 1995, 1997, 1999, 2001, 2007.
2. <http://www.wcad.org/appraisal/publicaccess/>, Property Assessment and Tax Information Interactive Search and GIS Map, Williamson Central Appraisal District, Williamson County, Texas, 2010.
3. Email correspondence, Jim Stendebach, City of Round Rock, Round Rock, Texas, April 21, 2009.
4. Comprehensive Transportation Master Plan, City of Round Rock. Adopted 2004.
5. http://www.roundrocktexas.gov/docs/round_rock_budget_09-10_cip_program_excerpt.pdf. Capital Improvement Program, fiscal year 2009-2010. City of Round Rock.
6. "Trip Generation, Version 6" Microtrans Corporation, 2008.
7. Trip Generation, An Informational Report, Eighth Edition, Institute of Transportation Engineers, Washington, D.C., 2008.
8. Trip Generation Handbook, An ITE Proposed Recommended Practice, Institute of Transportation Engineers, Washington, D.C., March 2001.
9. Highway Capacity Manual, (SR 209), Transportation Research Board, Washington, D.C., 2000.
10. CAMPO Mobility 2030 Plan, Capital Area Metropolitan Planning Organization in cooperation with The Texas Department of Transportation, Capital Metropolitan Transportation Authority, Travis County, Williamson County, Hays County, and the cities within the CAMPO region, Adopted June 6, 2005.
11. CAMPO, Transportation Modeling. Incorporated in CAMPO Mobility 2030 Plan. 2004.

APPENDIX

Kenney Fort Boulevard Roadway Impact Fee Assessment

**TABLE 1: Estimate of Probable Cost
Kenney Fort Boulevard, North of Brushy Creek to UPRR R.O.W (SOUTH)**

ITEM	COST (\$)
Roadway Construction Costs	6,631,856
Design Engineering Costs	598,820
R.O.W Costs	462,529
Project Construction Administration Costs	123,000
Specialty Construction Observation Costs	81,000
Signal Design/Construction Costs	225,000
Cost of Roadway Impact Fee Study	43,630
Total Cost of Capital Improvements Eligible for Impact Fees	8,165,835

See Table 2 for Breakdown of costs
See Table 2 for Breakdown of costs

Traffic signal to be installed at Development Driveway and Kenney Fort Blvd

TABLE 2: DESIGN AND CONSTRUCTION COSTS

SEGMENT LIMITS		DESIGN ENGINEERING COST	ULTIMATE CONDITION CONSTRUCTION COST
FROM UPRR ROW (SOUTH) TO STATION 35+00	City of Round Rock Trans.	\$ 389,770	\$ 1,903,314
KENNEY FORT BOULEVARD (66" STORM SEWER LINE	City of Round Rock Trans.	\$ -	\$ 2,964,424
FROM STA 35+00 TO BRUSHY CREEK BRIDGE NORTH ABUTMENT	Williamson County	\$ 209,050	\$ 1,764,118
		\$ 598,820	\$ 6,631,856
Total Project Construction Cost Assumes a 30 month Schedule			

Tract	Gross Acreage	Open Space	ROW	Net Acreage	Density (FAR or DU/Acre)			Size (SF or DU)			Trip Generation Land Use				
					Low	Med	High	Low	Med	High	Low	High			
Harris	113.17	21.24	2.96	88.97	0.4	0.6	2	542,583	813,875	2,712,917	Business Park Shopping Center	542,583			
								23.1	0.6	2		402,494	603,742	2,012,472	402,494
								R&D	0.6	2		673,002		2,243,340	Office R&D
Bison +Elrod +Reid	157.39 4.41 1.5	26.59	11.1	125.6	0.3	1.2	3	324,086	1,296,346	3,240,864	1/2 Retail	162,043			
								Mixed Use			1/2 Office	162,043			
								Business Park	44.79	0.3	2	585,316	3,902,105	Business Park	585,316
								Mixed Use (Live/Work)	32.15	0.3	1.2	420,136	1,680,545	1/2 Retail	210,068
								Multifamily	18.55	15	30	50	278	557	928
Keller-Johnson	60.58	10.88	0	49.7	0.3	0.6	3	649,480	1,298,959	6,494,796	Business Park	649,480			
Krienke	157.09	34.33	0	122.76	0.3	0.6	0.6	1,604,228		3,208,455	Business Park	1,604,228			
								Business Park							

Harris Tract Update
Summary of Multi-use Trip Generation
Average Weekday Driveway Volumes
May 05, 2010

Land Use	Size	24 Hour	AM Pk	Hour	PM Pk	Hour
		Two-Way Volume	Enter	Exit	Enter	Exit
Business Park	542,583 Th.Sq.Ft. GFA	6923	651	125	165	551
Shopping Center	402,494 Th.Sq.Ft. GLA	16789	214	137	792	825
Research and Development Center	673,002 Th.Sq.Ft. GFA	4816	569	117	93	527
Total Driveway Volume		28528	1434	379	1050	1903
Total Peak Hour Pass-By Trips			0	0	206	215
Total Peak Hour Vol. Added to Adjacent Streets			1434	379	844	1688

Note: A zero indicates no data available.

DATA COLLECTED FROM TRIP GENERATION BY MICROTRANS

Bison, Elrod, and Reid Tracts Update
 Summary of Multi-use Trip Generation
 Average Weekday Driveway Volumes
 May 05, 2010

Land Use	Size	24 Hour	AM Pk	Hour	PM Pk	Hour
		Two-Way Volume	Enter	Exit	Enter	Exit
Shopping Center	162.043 Th.Sq.Ft. GLA	9294	125	80	431	448
General Office Building	162.043 Th.Sq.Ft. GFA	1935	243	33	44	216
Business Park	585.316 Th.Sq.Ft. GFA	7469	702	135	176	591
Shopping Center	210.068 Th.Sq.Ft. GLA	11002	146	93	513	533
Apartments	241 Dwelling Units	1584	24	97	98	53
Apartments	278 Dwelling Units	1808	28	112	111	60
Total Driveway Volume		33092	1268	550	1373	1901
Total Peak Hour Pass-By Trips			0	0	307	320
Total Peak Hour Vol. Added to Adjacent Streets			1268	550	1066	1581

Note: A zero indicates no data available.

DATA COLLECTED FROM TRIP GENERATION BY MICROTRANS

Keller-Johnson Tract Update
Summary of Multi-use Trip Generation
Average Weekday Driveway Volumes
May 05, 2010

Land Use	Size	24 Hour Two-Way Volume	AM Pk Enter	Hour Exit	PM Pk Enter	Hour Exit
Business Park	649.48 Th.Sq.Ft. GFA	8287	779	149	194	650
Total Driveway Volume		8287	779	149	194	650
Total Peak Hour Pass-By Trips			0	0	0	0
Total Peak Hour Vol. Added to Adjacent Streets			779	149	194	650

Note: A zero indicates no data available.

DATA COLLECTED FROM TRIP GENERATION BY MICROTRANS

Krienke Tract Update
Summary of Multi-use Trip Generation
Average Weekday Driveway Volumes
May 05, 2010

Land Use	Size	24 Hour Two-Way Volume	AM Pk Enter	Hour Exit	PM Pk Enter	Hour Exit
Business Park	1604.228 Th.Sq.Ft. GFA	20470	1925	369	446	1493
Total Driveway Volume		20470	1925	369	446	1493
Total Peak Hour Pass-By Trips			0	0	0	0
Total Peak Hour Vol. Added to Adjacent Streets			1925	369	446	1493

Note: A zero indicates no data available.

DATA COLLECTED FROM TRIP GENERATION BY MICROTRANS

From: Ross, Heidi
Sent: Wednesday, October 07, 2009 9:39 AM
To: Jim Stendebach
Cc: Tom Word; Patrick, Benedict; Grimes, Tim; Clyde von Rosenberg
Subject: RE: Arterial A Impact Fee Study

Great. We will move forward.

- Heidi

-----Original Message-----

From: Jim Stendebach [mailto:jstendebach@round-rock.tx.us]
Sent: Wednesday, October 07, 2009 9:37 AM
To: Ross, Heidi
Cc: Tom Word
Subject: RE: Arterial A Impact Fee Study

The higher use where multiple uses are permitted should be used.

Jim Stendebach

-----Original Message-----

From: Ross, Heidi [mailto:Heidi.Ross@hdrinc.com]
Sent: Tuesday, October 06, 2009 11:20 AM
To: Jim Stendebach
Cc: Clyde von Rosenberg; Tom Word; Patrick, Benedict; Grimes, Tim
Subject: RE: Arterial A Impact Fee Study

Should we use Alternative 1 or 2 for the trip generation scenario?

From: Jim Stendebach <jstendebach@round-rock.tx.us>
Sent: Tuesday, October 06, 2009 9:27 AM
To: Ross, Heidi <Heidi.Ross@hdrinc.com>
Cc: Clyde von Rosenberg <cvonrosenberg@round-rock.tx.us>; Tom Word <tomword@round-rock.tx.us>
Subject: RE: Arterial A Impact Fee Study

Thanks Heidi. These now reflect the proposed uses.

Jim Stendebach

From: Ross, Heidi [mailto:Heidi.Ross@hdrinc.com]
Sent: Tuesday, October 06, 2009 7:33 AM
To: Clyde von Rosenberg; Jim Stendebach
Cc: Tom Word; Patrick, Benedict; Grimes, Tim
Subject: RE: Arterial A Impact Fee Study

Jim/Clyde,

Enclosed please find an updated land use summary spreadsheet and trip generation tables for land uses described in Jim Stendebach's April 21, 2009 email. Please note the following:

1. Business Park (ITE Code 770) has been used for business parks described in all four tracts.
2. Shopping Center (ITE Code 820) has been used for land uses called out as Commercial on Harris and Bison Tracts, as we believe this use most closely matches the description of zoning C1-a.
3. R & D Center (ITE Code 760) has been used for land uses called out as Research & Development on Harris Tract.
4. Apartments (ITE Code 220) has been used for land uses called out as multi-family and residential in Harris & Bison Tract.
5. General Office (ITE Code 710) has been used for land uses called out as office in Bison Tract.
6. Land uses called out as mixed use in Bison Tract assume $\frac{1}{2}$ of acreage and related square foot/dwelling units for each of the two uses involved. For example, 32.15 acres of mixed use includes the equivalent of 16.075 acres of shopping center (210,068 square feet) and 16.075 acres of apartments (241 dwelling units)
7. All land use assumptions were performed for the low density development level. The pink/blue highlighted lines on the enclosed Land Use Summary indicate an either/or land use assumption proposed in Jim's email. Trip Generation Alternative 1 assumes the land use choice on each respective tract that generates the higher trips. Trip Generation Alternative 2 assumes the land use choice on each tract that generates the lower number of trips.
8. Square foot calculations have been corrected for all tracts.
9. No internal capture or transit use reductions were included in the trip generation estimates.

Please review the attached and feel free to contact Benedict Patrick or me if you have any questions or need additional information. Also, please provide guidance on whether we should use Trip Generation Alternative 1 or 2, as well as your approval to move forward with these land use assumptions. Thanks.

~Heidi

Heidi Westerfield Ross, P.E., PTOE
Vice President
HDR|WHM Transportation
ONE COMPANY | Many Solutions
504 Lavaca Street, #1175 | Austin, TX | 78701
Phone: 512.904.3724 | Fax: 512.904.3773
Email: heidi.ross@hdrinc.com<blocked::mailto:heidi.ross@hdrinc.com>

From: Clyde von Rosenberg [mailto:cvonrosenberg@round-rock.tx.us]
Sent: Wednesday, September 30, 2009 10:49 AM
To: Patrick, Benedict
Cc: Ross, Heidi
Subject: RE: Arterial A Impact Fee Study

I apologize for not responding sooner. When Jim returned from vacation last week, I discussed this with him I assumed that he would be getting back to you. I will talk to him about it today.

-Clyde

From: Patrick, Benedict [mailto:Benedict.Patrick@hdrinc.com]
Sent: Wednesday, September 30, 2009 9:19 AM
To: Clyde von Rosenberg
Cc: Ross, Heidi
Subject: RE: Arterial A Impact Fee Study

Hi Clyde,

Can you please let us know when we can expect to receive your confirmation/comments regarding the land uses? Thanks for your help.

Benedict

From: Patrick, Benedict
Sent: Friday, September 25, 2009 9:52 AM
To: 'cvonrosenberg@round-rock.tx.us'
Subject: RE: Arterial A Impact Fee Study

Hi Clyde,

Hope you are doing well. Can you please let me know if you agree with the land use assumptions? Our draft report is due to the City by October 15 as per the schedule. Your help is appreciated.

Thanks,
Benedict

From: Patrick, Benedict
Sent: Friday, September 18, 2009 5:30 PM
To: 'cvonrosenberg@round-rock.tx.us'; 'jdean@round-rock.tx.us'
Cc: 'tomword@round-rock.tx.us'; Ross, Heidi
Subject: Arterial A Impact Fee Study

Hi Clyde,

As per our discussion on September 15, 2009, I have summarized the following information for your review/comments:

1. Attached is an email from Jim Stendebach summarizing the land use information that was used for the preliminary analysis.
2. Attached are two spreadsheets showing land use assumptions and associated trip generation, respectively.

Please review the attached information and confirm if we can proceed using these assumptions for transportation impact fee study.

John - Please provide us with Chris Collier's information so that we can coordinate obtaining the GIS files for the properties included in the study.

Feel free to contact Heidi or me if you have any questions.

Thanks,
Benedict

Benedict P. Patrick, P.E., PTOE

Project Manager

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 E-mail: jim.herrin@hdrinc.com

Fax: (512) 904-3773

OPERATIONAL ANALYSIS

Analyst: TAG
 Agency/Co: HDR
 Date: 1/25/2010
 Analysis Period: PM Peak Hour
 Highway: Kenney Fort Blvd, North Segmen
 From/To: Joe DiMaggio to Forest Creek
 Jurisdiction: Round Rock, TX
 Analysis Year: 2019
 Project ID: Arterial A Traffic Impact Fee Study

FREE-FLOW SPEED

Direction	1	2
Lane width	12.0 ft	12.0 ft
Lateral clearance:		
Right edge	0.0 ft	0.0 ft
Left edge	0.0 ft	0.0 ft
Total lateral clearance	0.0 ft	0.0 ft
Access points per mile	6	6
Median type	Divided	Divided
Free-flow speed:	Base	Base
FFS or BFFS	52.0 mph	52.0 mph
Lane width adjustment, FLW	0.0 mph	0.0 mph
Lateral clearance adjustment, FLC	3.9 mph	3.9 mph
Median type adjustment, FM	0.0 mph	0.0 mph
Access points adjustment, FA	1.5 mph	1.5 mph
Free-flow speed	46.6 mph	46.6 mph

VOLUME

Direction	1	2
Volume, V	3039 vph	1323 vph
Peak-hour factor, PHF	1.00	1.00
Peak 15-minute volume, v15	760	331
Trucks and buses	0 %	0 %
Recreational vehicles	0 %	0 %

Terrain type	Level	Level
Grade	0.00 %	0.00 %
Segment length	0.00 mi	0.00 mi
Number of lanes	3	3
Driver population adjustment, fP	1.00	1.00
Trucks and buses PCE, ET	1.5	1.5
Recreational vehicles PCE, ER	1.2	1.2
Heavy vehicle adjustment, fHV	1.000	1.000
Flow rate, vp	1013 pcphpl	441 pcphpl

RESULTS

Direction	1	2
Flow rate, vp	1013 pcphpl	441 pcphpl
Free-flow speed, FFS	46.6 mph	46.6 mph
Avg. passenger-car travel speed, S	46.6 mph	46.6 mph
Level of service, LOS	C	A
Density, D	21.7 pc/mi/ln	9.5 pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.